



## PATENT ABSTRACTS OF JAPAN

(11) Publication number: **2003267016 A**(43) Date of publication of application: **25.09.03**

(51) Int. Cl.

**B60G 7/00**  
**// B60G 9/04**  
**B60G 11/26**

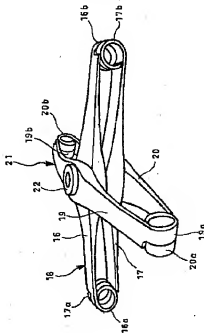
(21) Application number: **2002074854**(71) Applicant: **HORIKIRI:KK**(22) Date of filing: **18.03.02**(72) Inventor: **MOMIYAMA FUJIO**(54) **SUSPENSION LINK**

## (57) Abstract:

**PROBLEM TO BE SOLVED:** To reduce manufacturing cost and to largely decrease entire weight while securing a good function that is not inferior to a conventional X-link.

**SOLUTION:** A suspension link connects between an axle and a frame at the above position of the axle. A first leaf spring piece 16 and a second leaf spring piece 17 are vertically overlapped in a facing state to constitute a first I-type piece 18. A third leaf spring piece 19 and a fourth leaf spring piece 20 are vertically overlapped in a facing state on both sides of the first I-type piece 18 to constitute a second I-type piece 21. The first and second I-type piece 18 and 21 are arranged so that longitudinal central parts of them cross each other, and the crossing parts are connected tiltably via a vertically penetrating pin 22.

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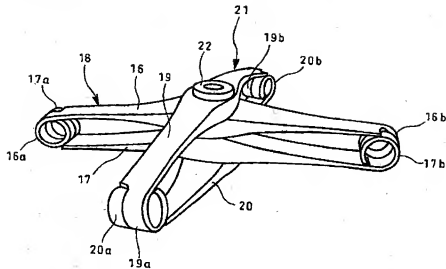
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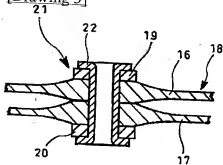
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## DRAWINGS

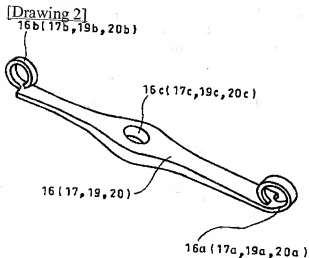
[Drawing 1]



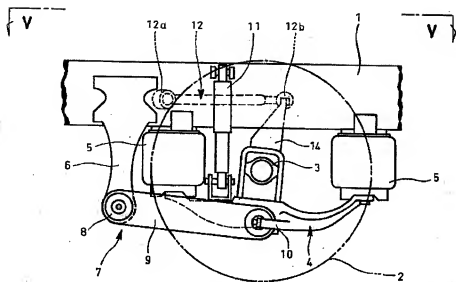
[Drawing 3]



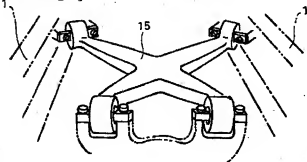
[Drawing 2]



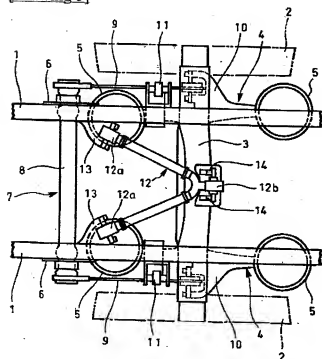
[Drawing 4]



[Drawing 6]



[Drawing 5]





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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a suspension link.

[0002]

[Description of the Prior Art] Drawing 4 and drawing 5 are what shows an example of the rear-suspension structure in large-sized cars, such as a truck and a bus. The frame 1 of a Uichi Hidari pair prolonged in the cross direction (longitudinal direction in drawing 4) of a car body caudad. The axle 3 for extending in the cross direction (the vertical direction in drawing 5), and supporting a wheel 2 to revolve with the both ends is arranged. Between the support-beam 4 order edge attached to the inferior surface of tongue of the edge approach of this axle 3 in one, and said frame 1 inferior surface of tongue, the air spring 5 which absorbs vibration of the vertical direction is infixed.

[0003] Moreover, the bracket 6 of the air spring 5 arranged at the before side prolonged in the lower part sense is further attached in the front frame 1, and between the lower limit section of this bracket 6 and the pars intermedia of said support beam 4 is connected free [ tilting ] by the stabilizer 7 which raises the roll rigidity of a car body.

[0004] Namely, the stabilizer 7 currently illustrated here. The stabilizer bar 8 which consists of the pipe (hollow shaft) of the hollow which is generally called the Roa Rod integral stabilizer and was constructed free [ rotation ] between the lower limit sections of the bracket 6 on either side. It is constituted by the arm 9 connected through the rubber bush to the bracket 10 which fixed and equipped the both ends of this stabilizer bar 8 with the end, and prepared the other end in the pars intermedia of said support beam 4, and pons delivery of between the wheels 2 on either side is carried out to the character type of KO. Although the stabilizer bar 8 rotates to a bracket 6 and especially the stabilizer 7 does not work when the wheel 2 on either side moves up and down to coincidence. When the vertical movement from which the wheel 2 on either side differs by a cornering etc. is accomplished, it is twisted to the stabilizer bar 8 and the moment acts, and work which returns the wheel 2 on either side by the reaction force is accomplished.

[0005] the variation rate to the angular moment (damping force and driving force) and the longitudinal direction of the circumference of the shaft applied to an axle 3 only with these arms 9 although it enables it to be managed even if the arm 9 in this stabilizer 7 also has the function to perform the location of an axle 3, and an include-angle arrangement as a torque rod by the side of Roa here and it does not independently prepare the torque rod by the side of Roa -- it is difficult to certainly hold down the moment.

[0006] For this reason, between the center-section top face of an axle 3 and the medial surfaces of the frame 1 on either side. It is connected with the V rod 12 which functions as a torque rod by the side of an upper. More specifically Branching edge 12a (front side edge section) which separated to right and left of this V rod 12 is connected through a rubber bush to the bracket 13 extended from the medial surface of the frame 1 on either side. Moreover, crookedness edge 12b (back side edge section) of V rod 12 center is connected through the rubber bush to the bracket 14 prepared in the center-section bottom of an axle 3.

[0007] And if such a V rod 12 is adopted, since it will become possible to correspond to the input of the sense of both the cross direction of a car body, and a longitudinal direction. Since it can be managed even if it does not install separately the lateral rod as a cure against an input of a

longitudinal direction like [ at the time of adopting the torque rod of an parallel link type ], and offset arrangement is moreover carried out to the lower arm 9 in the upper part It becomes possible to certainly hold down the angular moment of the circumference of the shaft concerning an axle 3. [0008] In addition, it is connected by the shock absorber 11 prolonged in the vertical direction, and \*\*\*\* return of vibration of the vertical direction is controlled by this shock absorber 11, and it is made to be planned in periodic damping between the halfway section of said support beam 4, and the frame 1 of the right above of it.

[0009] on the other hand, as a new suspension link replaced with the V rod 12 mentioned above in recent years \*\*\*\* shown in drawing 6 -- the really fabricated X link 15 being proposed so that an overall flat-surface configuration may accomplish an X type, and according to the X link 15 of such a flat-surface configuration On [ which can be corresponded to the input of the sense of both the cross direction of a car body, and a longitudinal direction like the case of the conventional V rod 12 ], Since work of a stabilizer which it is twisted when the vertical movement from which the wheel 2 (refer to drawing 4 and drawing 5 ) on either side differs by a cornering etc. is accomplished, and the moment acts, and returns the wheel 2 on either side by the reaction force is accomplished It becomes possible to transpose to the torque rod of a simple parallel link type, using the stabilizer 7 of the Roa Rod integral as shown in drawing 4 or drawing 5 as unnecessary.

[0010]

[Problem(s) to be Solved by the Invention] However, in the former, since he was trying to really by forging manufacture the X link 15 as mold goods, there was a problem that a manufacturing cost will cost dearly, moreover whole weight became big, it attached, and there was a problem that the workability at the time worsened.

[0011] This invention is what was made in view of the above-mentioned actual condition, and it aims at offering the new suspension link which enabled it to attain large lightweight-ization of reduction of the manufacturing cost, and whole weight, securing the outstanding function which is not inferior to the conventional X link.

[0012]

[Means for Solving the Problem] This invention is a suspension link which connects between this axle and frames in the top location of an axle, and while constituting the first I-beam piece from a condition facing each other in piles up and down, the first flat spring piece and the second flat spring piece On both sides of the I-beam piece of this first, the second I-beam piece is constituted for the third flat spring piece and the fourth flat spring piece from a condition facing each other in piles up and down in between. It is characterized by connecting free [ tilting ] by the pin which arranges the these firsts and second each of I-beam piece so that mutual longitudinal direction center sections may cross, and penetrates a part for the intersection in the vertical direction.

[0013] If it \*\* and does in this way, since it will become possible to constitute the suspension link of an X type only from attaching the first [ which can be cheaply manufactured using the production process of the usual flat spring ] thru/or fourth flat spring piece, it becomes possible to reduce a manufacturing cost sharply as compared with the case where the one cast of an X type is manufactured with forging.

[0014] Moreover, if the first and second height dimensions of I-beam piece are set up so that it may become large a little from the height dimension of the cross-section form of each arm part of the conventional X link Even if between the flat spring piece of the upper and lower sides serves as an opening and total of the mutual cross section is smaller than the cross section of each arm part of the conventional X link It becomes possible, since a big difference is not produced in a substantial second moment of area (numeric value showing the geometric difficulty of a beam cross section of bending to the bending moment) to lightweight-ize whole weight sharply, without really by forging causing a fall on the strength as compared with X link of a cast.

[0015] When it is that in which the first thru/or fourth flat spring piece has high toughness especially as compared with the usual plate, It is devised so that a part for the first and second intersection of I-beam piece may be connected free [ tilting ] and shearing stress may not act. It has structure with few burdens which will end if each flat spring piece corresponds only to simple bending stress by this. And since rational arrangement which another side pulls and deforms is adopted when it is in the condition facing each other for every I mold piece and either of up-and-down carries out a

compression set, it becomes possible to realize ultimate lightweight-ization under the conditions which secure a function equivalent to the conventional X link.

[0016]

[Embodiment of the Invention] The gestalt of operation of this invention is explained below, referring to a drawing.

[0017] Drawing 1 - drawing 3 are set to the suspension link of this example of a gestalt, as an example of a gestalt which carries out this invention is shown and it is shown in drawing 1. While constituting the first I-beam piece 18 from a condition facing each other in piles up and down, the first flat spring piece 16 and the second flat spring piece 17 On both sides of the I-beam piece 18 of this first, the second I-beam piece 21 is constituted for the third flat spring piece 19 and the fourth flat spring piece 20 from a condition facing each other in piles up and down in between. It has considered as the structure connected free [ tilting ] by the pin 22 which arranges the these firsts and second each of the I-beam piece 18 and 21 so that mutual longitudinal direction center sections may cross, and penetrates a part for the intersection in the vertical direction.

[0018] Here the first thru/or fourth flat spring piece 16, 17, 19, and 20 While being formed so that the same configuration may be accomplished in \*\*\*\*\* which all show to drawing 2, bringing near by one side of the cross direction and forming Eyes 16a, 17a, 19a, and 20a in the longitudinal direction end section of each flat spring piece 16, 17, 19, and 20 To the longitudinal direction other end of each flat spring piece 16, 17, 19, and 20 Bring near by crosswise one side and Eyes 16b, 17b, 19b, and 20b are formed so that it may become reverse said end section side. When it piles up and down in the condition facing each other with each combination partner, it is constituted so that it may stand in a line crosswise, without mutual eye 16a and eye 17a, eye 16b and eye 17b, eye 19a and eye 20a, and eye 19b and eye 20b interfering.

[0019] Moreover, the through tubes 16c, 17c, 19c, and 20c for making a pin 22 penetrate free [ sliding ] are drilled in the longitudinal direction center section of each flat spring piece 16, 17, 19, and 20, and each flat spring piece 16, 17, 19, and 20 of both is connected by crushing a vertical edge through the tubular rivet which accomplishes a pin 22 in the condition of having made these agreeing, enabling free tilting.

[0020] Actual use is faced. In addition, eye 16a, eye 17a, eye 16b and eye 17b, Fit-in wearing of the rocking pin which is not illustrated through a rubber bush to the boss section of the shape of a cylinder which each of eye 19a, eye 20a, and eye 19b and eye 20b constitutes is carried out. What is necessary is to connect through a bracket and just to connect the two remaining through a bracket to an axle top to the frame of any two right and left in this each rocking pin.

[0021] If it \*\* and a suspension link is constituted in this way, since it will become possible to constitute the suspension link of an X type only from attaching the first [ which can be cheaply manufactured using the production process of the usual flat spring ] thru/or fourth flat spring piece 16, 17, 19, and 20, as compared with the case where the one cast of an X type is manufactured with forging, a manufacturing cost will be reduced sharply.

[0022] Moreover, if the first and second height dimensions of the I-beam piece 18 and 21 are set up so that it may become large a little from the height dimension of the cross-section form of each arm part of the conventional X link Even if the flat spring piece 16 and 17 of the upper and lower sides and between 19 and 20 serve as an opening and total of the mutual cross section is smaller than the cross section of each arm part of the conventional X link It becomes possible, since a big difference is not produced in a substantial second moment of area (numeric value showing the geometric difficulty of a beam cross section of bending to the bending moment) to lightweight-ize whole weight sharply, without really by forging causing a fall on the strength as compared with X link of a cast.

[0023] Especially the first thru/or fourth flat spring piece 16, 17, 19, and 20 When it is what has high toughness as compared with the usual plate, it is devised so that a part for the first and second intersection of the I-beam piece 18 and 21 may be connected free [ tilting ] by the pin 22 and shearing stress may not act. It has structure with few burdens which will end if each flat spring piece 16, 17, 19, and 20 corresponds only to simple bending stress by this. And since rational arrangement which another side pulls and deforms is adopted when it is in the condition facing each other for every I mold piece and either of up-and-down carries out a compression set, it becomes possible to

realize ultimate lightweight-ization under the conditions which secure a function equivalent to the conventional X link.

[0024] Therefore, since according to the above-mentioned example of a gestalt the first thru/or fourth flat spring piece 16, 17, 19, and 20 can be attached and the suspension link of the X type which has the outstanding function which is not inferior to the conventional X link can be manufactured cheaply, the manufacturing cost can be reduced remarkably and, moreover, large lightweight-ization of whole weight can be attained.

[0025] In addition, as for the suspension link of this invention, it is needless to say that modification can be variously added within limits which do not deviate from that it is not limited only to the above-mentioned example of a gestalt, and can apply to the suspension structure of various formats and the other summaries of this invention.

[0026]

[Effect of the Invention] Securing the outstanding function which is not inferior to the conventional X link according to the suspension link of above-mentioned this invention, the manufacturing cost can be reduced remarkably and the outstanding effectiveness that large lightweight-ization of whole weight can moreover be attained can be done so.

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[Translation done.]